APPENDIX I

Dendrochronology of LANL Homestead Sites Impacted by the Cerro Grande Fire

Jeffrey S. Dean, Laboratory of Tree-Ring Research (Arizona)

[In January 2002, 57 archaeological tree-ring samples were sent to the University of Arizona Laboratory of Tree-Ring Research from Homestead period sites that were impacted by the Cerro Grande Fire. The following discussion and data are extracted and edited from correspondence provided to the LANL CRMT in a letter from Dr. Jeffrey S. Dean, dated May 3, 2002. Along with the results of the analyses of these 57 samples, Dr. Dean provided a summary of the analyses and results of 96 samples earlier submitted for the Victor Romero Cabin (LA 16806), which for convenience are included in this appendix. The Romero Cabin was originally situated in TA-55, but in 1987 was dismantled, moved, and reconstructed at its current location near the Fuller Lodge in the Los Alamos town site. The reader is referred to Foxx and Tierney (1999:63–70); and Masse et al. (2001)—Ed.]

Here are the results of our analyses of 57 archaeological tree-ring samples from seven historical homestead sites on LANL land. Included are date lists, species identification forms, and a key to the symbols appended to the dates. The 57 samples have been incorporated into the Laboratory of Tree-Ring Research existing Los Alamos Cabins site category (New Mexico I 77) and assigned LAC numbers in our Douglass Collection catalog (Table Appendix 1.1). Earlier collections from Los Alamos historical sites produced dates and are included here.

LA 16806 (Victor Romero Cabin)

We have three collections from the Romero Cabin (LA 16806) site. In July 1981, Charlie Steen submitted eight samples from the cabin (Feature 1), one from Feature 2 (which we discarded because it was too fragmentary to use), and one from the east fence (Accession A-576). These samples yielded the six dates reported on the A-576 date list. In June 1985, Dave Snow of Cross-Cultural Research Systems submitted 54 samples from the cabin (A-683). The 50 dates derived from these samples are on the A-683 date list. In November 1985, Snow submitted 32 samples that he and Ellen McGehee collected from Feature 2 (the hog pen). The 28 dates resulting from this analysis are given on the A-702 date list.

The distribution of cutting dates identifies six different wood procurement episodes for the logs from the cabin (Feature 1):

(1) As indicated by its incomplete terminal ring, ROM 25 was acquired during the ponderosa pine growing season (summer) of 1913. The dying or already dead ROM 1 element could have been

acquired at the same time as ROM 25. Alternatively, ROM 1 may have been obtained at the same time as other 1908 logs at this site and the David Romero homestead.

(2) The mixture of complete and incomplete terminal rings places acquisition of 31 logs in the spring of 1934 when 29 ROM trees with incomplete terminal rings dated to 1934 had begun growing and two trees (ROM 10 and LAC 3) with complete terminal rings dated to 1933 had not.

(3) An incomplete terminal ring series indicates that the ROM 37 tree was felled during the ponderosa pine growing season (summer) of 1935.

(4) Plus symbols suggest that three additional logs (ROM 38, 40, and 49) were obtained in the spring of 1938.

(5) A cluster of incomplete terminal rings near (+) cutting dates at 1960 and 1961 specifies wood procurement in the summer of 1961.

(6) Finally, nine cutting dates with complete terminal rings identify trees felled sometime after the ponderosa pine growing season of 1966, that is, between September 1966 and June 1967. The early non-cutting (vv) dates from Steen's samples probably reflect the erosion of rings from the exteriors of logs obtained during the 1934 tree felling event.

Deciding how these dates relate to construction episodes in the history of the cabin depends on the specific proveniences of the dates. The tree-ring evidence alone suggests some possibilities that can be evaluated against more complete data. It's high likely that the many logs obtained in spring 1934 were used in the initial construction of the cabin or, perhaps, in a major addition. Based on Snow's submission letter, the 1908 and/or 1913 logs likely were salvaged from older contexts and reused in 1934. The 1938 timbers may represent additions to the structure built in 1934, or all the 1930s logs may have been stockpiled for major construction in 1938. The two 1960s clusters could indicate separate additions in 1961 and 1966-1967, or the 1961 logs could have been stockpiled for use in 1966-1967.

Six or seven tree felling episodes are evident in the dates from Feature 2 (hog pen):

(1) Single trees were cut in the summers of 1894 and 1895.

(2) Single trees were cut in the summers of 1894 and 1895.

(3) A cluster of one near (+) cutting date at 1906 (ROM 65), one non-cutting date at 1907 (ROM 56), and one cutting date at 1908 (ROM 74) probably represent three trees cut together in the summer of 1908.

(4) One tree (ROM 63), a rare Douglass-fir, was cut in the summer of 1910.

(5) A strong cluster comprising one non-cutting date at 1910 (ROM 86) and 18 cutting dates at 1912 places a major wood procurement episode in 1912. Terminal rings show this event to have occurred at the end of the growing season when some trees had stopped growing for the year (those with complete terminal rings) and others (those with incomplete terminal rings) had not. These trees, therefore, were felled in August or September of 1912.

(6) Two later non-cutting dates place one or two minor wood procurement events no earlier than the 1920s and 1930s.

Dendrochronologically speaking, the hog pen probably was built in autumn of 1912. Logs acquired before 1912 probably were salvaged from older contexts and reused in the pen. The two younger dates probably represent minor repairs to the structure at least as late as 1931.

LA 131237 (David Romero/McDougall/Roybal Homestead --- originally designated LA 16806B)

Ten dates were derived from samples collected from Feature 4 (corral) at the David Romero Homestead (LA 16806B) by Ellen McGehee in July 1990 (A-930). A tight cluster of three non-cutting (LAC 16, 17, and 23) and two cutting (LAC 21 and 24) dates between 1906 and 1908 places wood procurement for the

corral in 1908. Incomplete terminal rings on the two cutting date samples place tree felling during the ponderosa pine growing season, that is, the summer of 1908. Exterior ring loss caused by weathering easily could account for the differences between these dates and 1908.

LA 16808 (Anchor Ranch)

One (LAC 52) of the six ponderosa pine samples from the Anchor Ranch (LA 16808) icehouse has a tight ring series that cannot be dated. A sample previously collected by Steen (LAC 13) produced a complete terminal ring cutting date that places tree felling after the 1929 growing season, that is, between September 1929 and June 1930. Three samples (LAC 54-56) yielded complete terminal ring cutting dates that place the felling of these trees between September 1933 and June 1934, roughly the same time as wood procurement for the Victor Romero cabin (LA 16806). Double plus (+ +) symbols suggest that two samples (LAC 57 and 53) represent deadwood elements from trees that died of natural causes in the late 19th or early 20th century. Interestingly, LAC 53 comes from the same tree as LAC 34 from the Homestead Bridge (LA 89826), which establishes a direct link between the bridge and Anchor Ranch.

LA 21334 (Sanchez y Montoya Homestead)

Two samples (LAC 35 and 36/37) from the Sanchez *y* Montoya Homestead (LA 21334) could not be dated. One sample (LAC 38) from the garden fence yielded a date of 1915 with a "+ +" symbol that suggest a deadwood element acquired after the tree died of natural causes. The canyon fence produced four non-cutting dates ranging from 1746 to 1840. Note that weathering and/or burning have removed the sapwood from all of these samples. Depending on the age of the tree, this could mean that the ponderosa pines have suffered the removal of 50 to 100 exterior rings. Therefore, the garden fence postdates 1915 by some years, and the canyon fence postdates 1840 by a period of unknown but substantial length.

LA 70028 (Vigil *y* Montoya Homestead)

Fourteen of the 19 samples from the Vigil *y* Montoya Homestead (LA 70028) failed to date for one or various combinations of the following conditions: too few rings, tight ring series, and serious false ring problems. Two elements from Feature 3 (LAC 79/80) came from a single tree that was felled an unknown number of years after 1855. The heartwood-sapwood boundary (HW/SW) dated at 1746 suggests that this (1855) may be fairly close to a cutting date. A "+ +" symbol suggests that Feature 4 South Log (LAC 73) represents an element acquired from a dying or dead tree in 1911 or sometime thereafter. The absence of sapwood indicates that LAC 81 (north of Feature 6) was felled many years after 1833. A similar lack of sapwood places acquisition of LAC 68 from the surface of Feature 7 many years after 1720. The "+ +" symbol suggests that LAC 64 from Northwest of Collection Grid A comes from a tree that was dying or already dead in 1963. About all that can be said from this array of dates is that there was some wood procurement activity as late as 1911 and possibly as late as 1963.

LA 85407 (Serna Homestead)

Although four samples from the Serna Homestead (LA 85407) dated, they all lack sapwood and, therefore, each was felled many years after its date.

LA 86643 (Gomez Homestead)

Unfortunately, all seven samples from the Gomez Homestead (LA 86643) are juniper fence posts that have highly erratic ring series at best with severe false ring problems; therefore, none of them could be dated.

LA 89770 (Homestead Boundary Fence)

Three samples from the boundary fence between the Gomez and Sanchez *y* Montoya homesteads (LA 8977) have too few rings to be dated. Although the remaining six samples dated, they all lack sapwood. Thus, about all that can be said is that the fence was built (or repaired) many years after 1890.

LA 89826 (Homestead Bridge)

Two ponderosa pine samples from the Homestead Bridge (LA 89826) have short and/or erratic ring series that cannot be dated. The third sample (LAC 34) produced a "+ +" date that may have come from a tree that was dying or dead of natural causes when it was harvested in or after 1899. A different element from the same tree occurs in the Anchor Ranch Ice House.

EXPLANATION OF TABLE SYMBOLS

The following symbols apply to Table Appendix 1.1 as follows:

The symbols used with the inside date are:

- year = no pith ring present
- p = pith ring present
- fp = the curvature of the inside ring indicates that it is far from the pith
- ±p = pith ring present, but due to the difficult nature of the ring series near the center of the specimen, an exact date cannot be assigned to it. The date is obtained by counting back from the earliest dated ring.
- ± = the innermost ring is not the pith ring and an absolute date cannot be assigned to it. A ring count is involved.

The symbols used with the outside date are:

- B = bark present
- G = beetle galleries are present on the surface of the specimen
- L = a characteristic surface patination and smoothness, which develops on beams stripped of bark, is present
- c = the outermost ring is continuous around the full circumference of the specimen. This symbol is used only if a recent section is present.
- r = less than a full section is present, but the outermost ring is continuous around available circumference
- v = a subjective judgment that, although there is no direct evidence of the true outside on the specimen, the date is within a very few years of being a cutting date
- vv = there is no way of estimating how far the last ring is from the true outside
- + = one or more rings may be missing near the end of the ring series whose

presence or absence cannot be determined because the specimen does not extend far enough to provide an adequate check

- ++ = a ring count is necessary due to the fact that beyond a certain point the specimen could not be dated

The symbols B, G, L, c, and r indicate cutting dates in order of decreasing confidence, unless a "+" or "++" is also present.

The symbols L, G, and B may be used in any combination with each other or with the other symbols except "v" and "vv". The "r" and "c" symbols are mutually exclusive, but may be used with L, G, B, "+" and "++". The "v" and "vv" are also mutually exclusive and may be used with the "+" and "++". The "+" and "++" are mutually exclusive but may be used in combination with all other symbols.

Table Appendix 1.1. Dendrochonological Results Associated with LANL Homesteads

Site Name and LA Number	Feature Type	Species	Date	Lab. No	Remarks
V. Romero Cabin LA 16806	Cabin	ponderosa	1908++	ROM-1	
" "	Cabin	ponderosa	1961+v	ROM-2	
" "	Cabin	ponderosa	1966rLB	ROM-3	
" "	Cabin	ponderosa	1966rLGB	ROM-4	
" "	Cabin	ponderosa	1934rB	ROM-5	
" "	Cabin	ponderosa	1934r	ROM-6	
" "	Cabin	ponderosa	1934r	ROM-7	
" "	Cabin	ponderosa	1934G	ROM-8	
" "	Cabin	ponderosa	1934r	ROM-9	
" "	Cabin	ponderosa	1933v	ROM-10	
" "	Cabin	ponderosa	1960+v	ROM-11	
" "	Cabin	ponderosa	1934v	ROM-12	
" "	Cabin	ponderosa	1934r	ROM-13	
" "	Cabin	ponderosa	1934rB	ROM-14	
" "	Cabin	ponderosa	1934rB	ROM-15	
" "	Cabin	ponderosa	1960+B	ROM-16	
" "	Cabin	ponderosa	1934r	ROM-17	
" "	Cabin	ponderosa	1934v	ROM-18	
" "	Cabin	ponderosa		ROM-19	Too short
" "	Cabin	ponderosa		ROM-20	Too short
" "	Cabin	ponderosa	1966r	ROM-21	
" "	Cabin	ponderosa	1934r	ROM-22	
" "	Cabin	ponderosa	1934v	ROM-23	
" "	Cabin	ponderosa	1966rB	ROM-24	
" "	Cabin	ponderosa	1913G	ROM-25	
" "	Cabin	ponderosa	1934r	ROM-26	
" "	Cabin	ponderosa	1934v	ROM-27	
" "	Cabin	ponderosa	1934r	ROM-28	
" "	Cabin	ponderosa	1934r	ROM-29	
" "	Cabin	ponderosa	1934r	ROM-30	
" "	Cabin	ponderosa	1934r	ROM-31	

Table A.1.1. (cont.)

Site Name and LA Number	Feature Type	Species	Date	Lab. No	Remarks
" "	Cabin	ponderosa	1934r	ROM-32	
" "	Cabin	ponderosa	1934rB	ROM-33	
" "	Cabin	ponderosa	1934rB	ROM-34	
" "	Cabin	ponderosa	1934rB	ROM-35	
" "	Cabin	ponderosa	1934rB	ROM-36	
" "	Cabin	ponderosa	1935rG	ROM-37	
" "	Cabin	ponderosa	1937G	ROM-38	
" "	Cabin	ponderosa	1966rLGB	ROM-39	
" "	Cabin	ponderosa	1938G	ROM-40	
" "	Cabin	ponderosa	1960+v	ROM-41	
" "	Cabin	ponderosa	1966rLB	ROM-42	
" "	Cabin	ponderosa	1966rB	ROM-43	
" "	Cabin	ponderosa	1934rG	ROM-44	
V. Romero Cabin LA 16806	Cabin	ponderosa	1934r	ROM-45	
" "	Cabin	ponderosa	1934v	ROM-46	
" "	Cabin	ponderosa	1934v	ROM-47	
" "	Cabin	ponderosa	1934v	ROM-48	
" "	Cabin	ponderosa	1937+rG	ROM-49	
" "	Cabin	ponderosa		ROM-50	Too short
" "	Cabin	ponderosa	1966r	ROM-51	
" "	Cabin	ponderosa	1961+rLB	ROM-52	
" "	Cabin	ponderosa		ROM-53	Same tree as #45
" "	Cabin	ponderosa	1934r	ROM-54	
				ROM-55	
" "	Hog Pen	ponderosa	1907vv	ROM-56	
" "	Hog Pen	ponderosa	1912B	ROM-57	
" "	Hog Pen	ponderosa	1931vv	ROM-58	
				ROM-59	
" "	Hog Pen	ponderosa	1912G	ROM-60	
" "	Hog Pen	ponderosa	1895rG	ROM-61	
				ROM-62	
" "	Hog Pen	Douglas fir	1910r	ROM-63	
" "	Hog Pen	Ponderosa	1912G	ROM-64	
" "	Hog Pen	Ponderosa	1906+rG	ROM-65	
" "	Hog Pen	Ponderosa	1912LB	ROM-66	
" "	Hog Pen	ponderosa	1912G	ROM-67	
" "	Hog Pen	ponderosa	1912G	ROM-68	
" "	Hog Pen	ponderosa	1912G	ROM-69	
" "	Hog Pen	ponderosa	1912G	ROM-70	
" "	Hog Pen	ponderosa	1912G	ROM-71	
" "	Hog Pen	ponderosa	1894r	ROM-72	
" "	Hog Pen	ponderosa	1912GB	ROM-73	
" "	Hog Pen	ponderosa	1908G	ROM-74	
" "				ROM-75	

Table A.1.1. (cont.)

Site Name and LA Number	Feature Type	Species	Date	Lab. No	Remarks
" "	Hog Pen	ponderosa	1912r	ROM-76	
" "	Hog Pen	ponderosa	1912rG	ROM-77	
" "	Hog Pen	ponderosa	1898++vv	ROM-78	
" "	Hog Pen	ponderosa	1922++vv	ROM-79	
" "	Hog Pen	ponderosa	1912rG	ROM-80	
" "	Hog Pen	ponderosa	1912GB	ROM-81	
" "	Hog Pen	ponderosa	1912rLB	ROM-82	
" "	Hog Pen	ponderosa	1912G	ROM-83	
" "	Hog Pen	ponderosa	1912rG	ROM-84	
" "	Hog Pen	ponderosa	1912G	ROM-85	
" "	Hog Pen	ponderosa	1910vv	ROM-86	
" "		ponderosa	1776+p – 1908vv	LAC-1	
				LAC-2	
" "		ponderosa	1829p – 1933rGB	LAC-3	
V. Romero Cabin LA 16806		ponderosa	1776+p – 1892vv	LAC-4	
" "		ponderosa	1863 – 1926vv	LAC-5	
" "		ponderosa	1816 – 1932vv	LAC-6	
" "		ponderosa	1873 – 1934vv	LAC-7	
				LAC-8	
				LAC-9	
				LAC-10	
				LAC-11	
				LAC-12	
D. Romero Cabin LA 131237	Corral	ponderosa	1798p – 1884vv	LAC-15	
" "	Corral	ponderosa	1797p – 1906vv	LAC-16	
" "	Corral	ponderosa	1835p – 1906vv	LAC-17	
" "	Corral	ponderosa	1787p – 1883vv	LAC-18	
" "	Corral	ponderosa	1792p – 1853vv	LAC-19	
" "	Corral	ponderosa	1809p – 1898vv	LAC-20	
" "	Corral	ponderosa	1837p – 1908rG	LAC-21	
" "	Corral	ponderosa	1841p – 1898vv	LAC-22	
" "	Corral	ponderosa	1804p – 1908vv	LAC-23	
" "	Corral	ponderosa	1810p – 1908v	LAC-24	
Anchor Ranch LA 16808	Ice House	ponderosa	1806p – 1929GB	LAC-13	
				LAC-14	
" "	Ice House	ponderosa		LAC-52	Compressed ring series
" "	Ice House	ponderosa	1783p – 1899++rLGB	LAC-53	Same as LAC-54 (Bridge)
" "	Ice House	ponderosa	1822p – 1933rLGB	LAC-54	Compressed W side

Table A.1.1. (cont.)

Site Name and LA Number	Feature Type	Species	Date	Lab. No	Remarks
" "	Ice House	ponderosa	1798p – 1933rLGB	LAC-55	Compressed W side
" "	Ice House	ponderosa	1878p – 1933rLGB	LAC-56	Compressed S side
" "	Ice House	ponderosa	1790p – 1896++rLGB	LAC-57	Compressed S side
Sanchez *y* Montoya Homestead LA 21334	Garden Fence	ponderosa		LAC-35	Too short (23 rings). Broken BE
" "	Garden Fence	ponderosa		LAC-36	Too short (29 rings). Axe cut BE
" "	Garden Fence	ponderosa		LAC-37	Too short (29 rings). Axe cut BE
" "		ponderosa	1794 – 1915++vv	LAC-38	
" "		ponderosa	1707p – 1777vv	LAC-39	
" "		ponderosa	1687p – 1746vv	LAC-40	
" "		ponderosa	1687p – 1791vv	LAC-41	
" "		piñon	1749p – 1840vv	LAC-42	
Vigil *y* Montoya Homestead LA 70028	Feature 1	ponderosa		LAC-62	Compressed
" "	SW corner	ponderosa		LAC-63	Compressed
" "	N&W of collection grid	ponderosa	1836p – 1963++G	LAC-64	HW/SW at 1874
" "	Feature 7	ponderosa		LAC-65	Too short (27 rings). No sapwood
" "	Feature 7	ponderosa		LAC-66	Too short (32 rings). No sapwood
" "	Feature 7	juniper		LAC-67	False rings
" "	Feature 7	piñon	1562 – 1720vv	LAC-68	No sapwood
" "	Feature 7	ponderosa		LAC-69	Too short (43 rings). No sapwood
" "	Feature 7	ponderosa		LAC-70	Too short (33 rings). No sapwood
" "	Feature 6	ponderosa		LAC-71	Too short (30 rings). No sapwood
" "	Feature 6	ponderosa		LAC-72	No sapwood
" "	Feature 4	ponderosa	1836p – 1911++G	LAC-73	HW/SW at 1843
" "	Feature 4	ponderosa		LAC-74	Short. False rings. No sapwood
" "	Feature 4	ponderosa		LAC-75	Too short (18 rings). No sapwood
" "	Feature 4	ponderosa		LAC-76	No sapwood
" "	Feature 4	ponderosa		LAC-77	Too short (23 rings). No sapwood

Table A.1.1. (cont.)

Site Name and LA Number	Feature Type	Species	Date	Lab. No	Remarks
" "	Feature 4	ponderosa		LAC-78	Compressed. No sapwood
" "	Feature 3	ponderosa	1650p – 1855+vv	LAC-79	HW/SW at 1746
" "	Feature 3	ponderosa	1650p – 1855+vv	LAC-80	HW/SW at 1746
" "	Feature 6	ponderosa	1759p – 1833vv	LAC-81	No sapwood
Serna Homestead LA 85407	Wood pile, SE corner	ponderosa	1769 – 1815vv	LAC-58	No sapwood
" "	Wood pile, SE corner	ponderosa	1754p – 1819vv	LAC-59	No sapwood
" "	Structure, W side	ponderosa	1685 – 1792vv	LAC-60	No sapwood
" "	Fence Line	ponderosa	1780p – 1826vv	LAC-61	No sapwood
Gomez Homestead LA 85407	Fence Line	juniper		LAC-25	Erratic. False rings
" "	Fence Line	juniper		LAC-26	Erratic. False rings
" "	Fence Line	juniper		LAC-27	Erratic. False rings
Gomez Homestead LA 85407	Fence Line	juniper		LAC-28	Erratic. False rings
" "	Fence Line	juniper		LAC-29	Erratic. False rings
" "	Fence Line	juniper		LAC-30	Erratic. False rings
" "	Fence Line	juniper		LAC-31	Erratic. False rings
LA 89770 (Gomez/Sanchez *y* Montoya Boundary Fence)	Fence Line	ponderosa	1793p – 1831vv	LAC-43	No sapwood
" "	Fence Line	ponderosa	1777p – 1820+vv	LAC-44	No sapwood
" "	Fence Line	ponderosa	1796p – 1834vv	LAC-45	No sapwood
" "	Fence Line	ponderosa	1793p – 1831vv	LAC-46	No sapwood
" "	Fence Line	ponderosa		LAC-47	Too short (17 rings). No sapwood
" "	Fence Line	ponderosa		LAC-48	Too short (37 rings). No sapwood
" "	Fence Line	ponderosa	1775p – 1837vv	LAC-49	No sapwood
" "	Fence Line	ponderosa		LAC-50	Too short (27 rings). No sapwood
" "	Fence Line	ponderosa	1809p – 1890vv	LAC-51	No sapwood
LA 89826 (Homestead Bridge)	Bridge	ponderosa	1783p – 1899++rLGB	LAC-34	Same as LAC-53 (Anchor Ranch)
" "	Bridge W log	ponderosa			Short. Erratic
" "	Bridge E log	ponderosa			Erratic